

REMARKS

This is in response to the Office Action mailed on January 25, 2005, and the references cited therewith.

No claims have been amended. Claims 1-44 are now pending in this application.

§103 Rejection of the Claims

Claims 1, 2, 11-15, 22-25, 32-36, 43 and 44 were rejected under 35 USC § 103(a) as being unpatentable over Bartley (U.S. Patent No. 6,219,796) in view of Y. Li et al. (A framework for estimating and minimizing energy dissipation of embedded hw/sw systems). This rejection is respectfully traversed.

The Office Action states that Bartley does not disclose "...satisfying user-specified real-time constraints..", but then indicates that Li et al., discloses "...satisfying user-specified real-time constraints...". The Office Action then indicates that it would be obvious to combine Bartley and Li et al. Applicant does not believe that the references are properly combinable, as each is directed to very different aspects of power reduction.

Bartley inserts power-down instructions into programming with the goal of reducing power consumption. Li et al., describes a very different type of system. In Li et al., an embedded system is described, where the software and hardware components are designed and modified with power conservation in mind. Software may be transformed, and different sizes of cache and main memory are considered to optimize power conservation. In that process, which is very different from the power down aspects of the present application and Bartley, there is no consideration of powering down different components. Rather, the components themselves may be modified in size to conserve power.

As can be seen, the approaches of Li et al. versus those of the present application and Bartley are very different. While both may be directed to improving energy consumption, there is nothing in Bartley and Li et al. that indicate different aspects of them may be combined. The Office Action first indicates that the motivation to combine them comes from Bartley, "as he refers to program segments having a duration no longer than a "predetermined threshold." (Column 7, lines 42-43) , wherein it is obvious the threshold may be determined by a user either via a user selected algorithm or other user input." First, the quote is incorrect, in that the

program section should have a duration **longer** than the predetermined threshold, not “**no longer**.” The purported motivation is in the context of finding code segments of long enough duration to make it worth shutting down a functional unit. If it would take longer than the amount of time required for execution of the segment to turn it off and then turn it back on, it would not make sense to turn it off in the first place. “Various power modeling techniques can be used to determine the length of time during which it is more efficient to turn a component off (or partially off) then on again versus leaving it on.” Col. 7, lines 16-19. It does not relate directly to satisfying user-specified real time constraints or program performance as currently claimed. As such, it would not suggest to one of skill in the art that performance optimization goals should be considered. In practice, with the presently claimed invention, there may be many places in code where a power down instruction could be added. The claimed invention allows one to determine where to put them to optimize power consumption within user specified constraints.

The Office Action also indicated that Li et al. disclosed “...satisfying user-specified real-time constraints...” It should be noted that Li et al., describes different optimization goals in the context of changing sizes of cache and main memory, not in the context of powering down different functional units. This great difference in architecture and methodology of conserving power makes it highly unlikely that Li et al., would be considered by one of skill in the art when focusing on powering down different functional units.

Independent claims 14, 24, and 34 all contain similar recitations and distinguish the references for at least the same reasons.

Claims 3-10, 16-21, 26-31 and 37-42 were rejected under 35 USC § 103(a) as being unpatentable over Bartley (U.S. Patent No. 6,219,796) in view of Y. Li et al. and further in view of G. Ramalingam (Data Flow Frequency Analysis, SIGPLAN Conference on Programming Language Design and Implementation, 1996). This rejection is respectfully traversed, as all depend from independent claims that are believed allowable.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6972 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.


Respectfully submitted,

ANIL SETH ET AL.


By their Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. Box 2938
Minneapolis, MN 55402
(612) 373-6972


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By 
Bradley A. Forrest
Reg. No. 30,837

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 25th day of July, 2005.



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